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Towards the Optical Second: The next generation of Thailand Standard Time

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Standard time and frequency are widely implemented in many systems: global navigation satellite system, high speed communication, and financial technology. Each application requires different accuracy and stability. Atomic clock has been used as the precise oscillator. In 1967, the energy level between two hyperfine ground states of Cesium 133 at 0 K has been defined as the standard unit of time. However, the next generation of the atomic clock, called "Optical Clock"has illustrated the uncertainty below 10^{-17}. The optical transition of various atoms and ions are selected as the second representative of second. NIMT has developed the next generation of atomic clock using an Ytterbium ion. The core technology i.e., electronics control, helical resonator and linear quadrupole trap has been designed and built in Thailand. The system has been successfully trapped single ion of Yb174.

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